

## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

### RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750)

#### Migration of Contaminated Groundwater Under Control

<b>Facility Name:</b>	Pueblo Chemical Depot
<b>Facility Address:</b>	45825 Highway 96 East, Pueblo CO 81006
<b>Facility EPA ID #:</b>	CO8213820725

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

☒ **X** If yes - check here and continue with #2 below.  
☐ If no - re-evaluate existing data, or  
☐ If data are not available skip to #6 and enter **AIN** (more information needed) status code.

#### **BACKGROUND**

##### **Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

##### **Definition of Migration of Contaminated Groundwater Under Control EI**

A positive Migration of Contaminated Groundwater Under Control EI determination (**AYE** status code) indicates that the migration of contaminated groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original area of contaminated groundwater (for all groundwater contamination subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

##### **Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The Migration of Contaminated Groundwater Under Control EI pertains **ONLY** to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

##### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database **ONLY** as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 2

2. Is **groundwater** known or reasonably suspected to be **Acontaminated**<sup>1</sup> above appropriately protective **Alevels** (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

- X        If yes - continue after identifying key contaminants, citing appropriate **Alevels**, and referencing supporting documentation.
- If no - skip to #8 and enter **AYE** status code, after citing appropriate **Alevels**, and referencing supporting documentation to demonstrate that groundwater is not **Acontaminated**.
- If unknown - skip to #8 and enter **AIN** status code.

Rationale and Reference(s):

There are two groundwater contaminant plumes at the facility. A solvent plume originates in the South Central Terrace Area and an explosives plume originates in the Southwest Terrace Area. Both plumes have affected on-site and off-site areas. The concentrations of Royal Demolition Explosive (RDX), 2,4-Dinitrotoluene, Nitrate, Trichloroethene, and cis-1,2-Dichloroethene exceed either Ground Water Quality Standards (GWQS) or Risk-Based Screening Levels (RBSLs) at or near the property boundary. Groundwater extraction and treatment systems are operational in both the South Central Terrace and Southwest Terrace. In addition, an interim action has been taken in each of the primary source areas for each plume to address source removal.

<u>Contaminant</u>	<u>GWQS or RBSL</u>
RDX	0.55 ì g/L
2,4-DNT	0.0885 ì g/L
1,3,5-Trinitrobenzene	361 ì g/L
1,3-Dinitrobenzene	1.2 ì g/L
2,4,6-Trinitrotoluene	2.01 ì g/L
2,6-DNT	0.0885 ì g/L
Nitrate	10 mg/L
Bromodichloromethane	0.56 ì g/L
Tetrachloroethene	5 ì g/L
Trichloroethene	5 ì g/L
cis-1,2-Dichloroethene	70 ì g/L
Vinyl chloride	2 ì g/L
trans-1,2-Dichloroethene	100 ì g/L

- System Operation Assessment Report for the Interim Corrective Action Groundwater Remediation System (annual report)
- Performance Assessment Report for the Interim Corrective Action Groundwater Remediation System (monthly report)
- SWMU 17/Southwest Terrace Area Boundary Demonstration of Compliance Report
- SWMU 17/Southwest Terrace Area Monthly Status Reports

Footnotes:

<sup>1</sup>**AContamination** and **Acontaminated** describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate **Alevels**

**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 3

(appropriate for the protection of the groundwater resource and its beneficial uses).

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 4

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within the existing area of contaminated groundwater<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?

- ☒ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the existing area of groundwater contamination<sup>2</sup>.
- ☐ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the existing area of groundwater contamination<sup>2</sup>) - skip to #8 and enter ANO status code, after providing an explanation.
- ☐ If unknown - skip to #8 and enter AIN status code.

Rationale and Reference(s):

Groundwater monitoring wells have been installed within each plume, and bounding each plume. These wells have been, and will continue to be, routinely monitored. Both plumes have stabilized in the past year and there have not been confirmed detections of contaminants in the outlying wells used to identify the limits of the plume. Groundwater treatment systems are operational at the facility boundary for both plumes.

- SWMU 17/Southwest Terrace Corrective Measure Monitoring Plan
- Interim Corrective Action Groundwater Remediation System, Performance and Compliance Monitoring Plan, January 2002
- System Operation Assessment Report for the Interim Corrective Action Groundwater Remediation System (annual report)
- Performance Assessment Report for the Interim Corrective Action Groundwater Remediation System (monthly report)
- SWMU 17/Southwest Terrace Area Boundary Demonstration of Compliance Report
- SWMU 17/Southwest Terrace Area Monthly Status Reports

<sup>2</sup> Existing area of contaminated groundwater is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of contamination that can and will be sampled/tested in the future to physically verify that all contaminated groundwater remains within this area, and that the further migration of contaminated groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 5

4. Does Acontaminated@groundwater **discharge** into **surface water** bodies?

- X**     If yes - continue after identifying potentially affected surface water bodies.
- If no - skip to #7 (and enter a AYE@status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater Acontamination@does not enter surface water bodies.
- If unknown - skip to #8 and enter AIN@status code.

Rationale and Reference(s):

Monitoring of seeps and springs indicates that groundwater contamination does discharge to surface water bodies. In the South Central Terrace Area, a contaminated seep discharges to Unnamed Creek. In the Southwest Terrace Area, a spring called Ciruli Spring, discharges to, and is the water source for, a series of ponds.

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 6

5. Is the **discharge** of **Acontaminated@**groundwater into surface water likely to be **Ainsignificant@** (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater **Alevel,@**and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

       **X** If yes - skip to #7 (and enter **AYE@**status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater **Alevel,@**the value of the appropriate **Alevel(s),@**and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

       If no - (the discharge of **Acontaminated@**groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater **Alevel,@**the value of the appropriate **Alevel(s),@**and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater **Alevels,@**the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

       If unknown - enter **AIN@**status code in #8.

**Rationale and Reference(s):**

The concentration of TCE in the seep discharging to Unnamed Creek is approximately 4 times the GWQS. The discharge point is directly upgradient of the facility boundary. There are no detectable concentrations of the contaminants of concern in samples of the surface water in Unnamed Creek at the facility boundary.

The concentration of 2,4-DNT in Ciruli Spring is approximately 5 times the RBSL. There were no concentrations of explosives exceeding the RBSLs in the receiving water.

- System Operation Assessment Report for the Interim Corrective Action Groundwater Remediation System (annual report)
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- SWMU 17/Southwest Terrace Area Monthly Status Reports

<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 7

6. Can the **discharge** of **Acontaminated@**groundwater into surface water be shown to be **Acurrently acceptable@** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented<sup>4</sup>)?

\_\_\_\_\_ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment **Alevels,@** as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

\_\_\_\_\_ If no - (the discharge of **Acontaminated@**groundwater can not be shown to be **Acurrently acceptable@**) - skip to #8 and enter **ANO@** status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

\_\_\_\_\_ If unknown - skip to 8 and enter **AIN@** status code.

Rationale and Reference(s):

<sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 8

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the existing area of contaminated groundwater?@

  X   If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the existing area of groundwater contamination.@

       If no - enter ANO@status code in #8.

       If unknown - enter AIN@status code in #8.

Rationale and Reference(s):

Routine sampling of monitoring wells is required for each of the plumes, and monitoring reports are submitted for CDPHE review. The well locations monitored are specified in the Corrective Measures Monitoring Report and the Performance Monitoring and Compliance Plan.

- System Operation Assessment Report for the Interim Corrective Action Groundwater Remediation System (annual report)
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- SWMU 17/Southwest Terrace Corrective Measure Monitoring Plan
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**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 9

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

☒ **YE** - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Pueblo Chemical Depot facility, EPA ID # **CO8213820725**, located at 45825 Highway 96 East, Pueblo CO. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

☐ **NO** - Unacceptable migration of contaminated groundwater is observed or expected.

☐ **IN** - More information is needed to make a determination.

Completed by	(signature)		Date	09/25/2002
	(print)	Deb Anderson		
	(title)	Project Manager		

Supervisor	(signature)		Date	09/25/2002
	(print)	Susan Chaki		
	(title)	Corrective Action Unit Leader		
	(EPA Region or State)	Colorado		

Locations where References may be found:
CDPHE Records Center, 4300 Cherry Creek Dr. S, Denver CO 80246 Pueblo Chemical Depot, 45825 Highway 96 East, Pueblo CO 81006

Contact telephone and e-mail numbers

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**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 10